Assessment of muscle activity and joint angles in small-handed pianists.

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Abstract
This pilot study examined whether the use of a 7/8 keyboard contributed to the physical ease of small-handed pianists as compared with the conventional piano keyboard. A secondary research question focused on the progression of physical ease in pianists making the transition from one keyboard to the other.
A hand span of 8 inches or less was used to define a "small-hand" pianist. The goal was to measure muscle loading and hand span during performance of a specified musical excerpt. For data collection, each of the two participants was fitted with an electromyography system via surface electrodes, which were placed on the back/shoulder, parts of the hand and arm, and masseter muscle of the jaw. Subjects also were fitted with electrogoniometers to capture how the span from the first metacarpophalangeal (MCP) joint to the fifth MCP joint moves according to performance demands, as well as wrist flexion and extension and radial and ulnar deviation. We found that small-handed pianists preferred the smaller keyboard and were able to transition between it and the conventional keyboard. The maximal angle of hand span while playing a difficult piece was about 5° smaller radially and 10° smaller ulnarily for the 7/8 keyboard, leading to perceived ease and better performance as rated by the pianists.